BISS Biodiversity Information Science and Standards

Biodiversity Information Science and Standards 4: e59234
doi: 10.3897/biss.4.59234

OPEN ACCESS

Conference Abstract

Redesigning the Trading Zone between Systematics and Conservation: Insights from Malagasy mouse lemur classifications, 1982 to present

Nico M. Franz[‡], Beckett W. Sterner[‡], Nathan S. Upham[‡], Kevin A. Cortés Hernández[‡]

‡ Arizona State University, Tempe, United States of America

Corresponding author: Nico M. Franz (nico.franz@asu.edu)

Received: 01 Oct 2020 | Published: 09 Oct 2020

Citation: Franz NM, Sterner BW, Upham NS, Cortés Hernández KA (2020) Redesigning the Trading Zone between Systematics and Conservation: Insights from Malagasy mouse lemur classifications, 1982 to present. Biodiversity Information Science and Standards 4: e59234. https://doi.org/10.3897/biss.4.59234

Abstract

Translating information between the domains of systematics and conservation requires novel information management designs. Such designs should improve interactions across the *trading zone* between the domains, herein understood as the model according to which knowledge and uncertainty are productively translated in both directions (cf. Collins et al. 2019). Two commonly held attitudes stand in the way of designing a well-functioning systematics-to-conservation trading zone. On one side, there are calls to unify the knowledge signal produced by systematics, underpinned by the argument that such unification is a necessary precondition for conservation policy to be reliably expressed and enacted (e.g., Garnett et al. 2020). As a matter of legal scholarship, the argument for systematic unity by legislative necessity is principally false (Weiss 2003, MacNeil 2009, Chromá 2011), but perhaps effective enough as a strategy to win over audiences unsure about robust law-making practices in light of variable and uncertain knowledge. On the other side, there is an attitude that conservation cannot ever restrict the academic freedom of systematics as a scientific discipline (e.g., Raposo et al. 2017). This otherwise sound argument misses the mark in the context of designing a productive trading zone with conservation. The central interactional challenge is not whether the systematic knowledge

can vary at a given time and/or evolve over time, but whether these signal dynamics are tractable in ways that actors can translate into robust maxims for conservation.

Redesigning the trading zone should rest on the (historically validated) projection that systematics will continue to attract generations of inspired, productive researchers and broad-based societal support, frequently leading to protracted conflicts and dramatic shifts in how practioners in the field organize and identify organismal lineages subject to conservation. This confident outlook for systematics' future, in turn, should refocus the challenge of designing the trading zone as one of building better information services to model the concurrent conflicts and longer-term evolution of systematic knowledge. It would seem unreasonable to expect the International Union for Conservation of Nature (IUCN) Red List Index to develop better data science models for the dynamics of systematic knowledge (cf. Hoffmann et al. 2011) than are operational in the most reputable information systems designed and used by domain experts (Burgin et al. 2018). The reasonable challenge from conservation to systematics is not to stop being a science but to be a better data science.

In this paper, we will review advances in biodiversity data science in relation to representing and reasoning over changes in systematic knowledge with computational logic, i.e., modeling systematic intelligence (Franz et al. 2016). We stress-test this approach with a use case where rapid systematic signal change and high stakes for conservation action intersect, i.e., the Malagasy mouse lemurs (*Microcebus* É. Geoffroy, 1834 sec. Schüßler et al. 2020), where the number of recognized species-level concepts has risen from 2 to 25 in the span of 38 years (1982–2020). As much as scientifically defensible, we extend our modeling approach to the level of individual published occurrence records, where the inability to do so sometimes reflects substandard practice but more importantly reveals systemic inadequacies in biodiversity data science or informational modeling.

In the absence of shared, sound theoretical foundations to assess taxonomic congruence or incongruence across treatments, and in the absence of biodiversity data platforms capable of propagating logic-enabled, scalable occurrence-to-concept identification events to produce alternative and succeeding distribution maps, there is no robust way to provide a knowledge signal from systematics to conservation that is both consistent in its syntax and acccurate in its semantics, in the sense of accurately reflecting the variation and uncertainty that exists across multiple systematic perspectives.

Translating this diagnosis into new designs for the trading zone is only one "half" of the solution, i.e., a technical advancement that then would need to be socially endorsed and incentivized by systematic and conservation communities motivated to elevate their collaborative interactions and trade robustly in inherently variable and uncertain information.

Presenting author

Nico M. Franz

Presented at

TDWG 2020

References

- Burgin CJ, Colella JP, Kahn PL, Upham NS (2018) How many species of mammals are there? Journal of Mammalogy 99 (1): 1-14. https://doi.org/10.1093/jmammal/gyx147
- Chromá M (2011) Synonymy and Polysemy in Legal Terminology and Their Applications to Bilingual and Bijural Translation. Research in Language 9 (1): 31-50. https://doi.org/10.2478/v10015-011-0004-2
- Collins H, Evans R, Gorman M (2019) Trading Zones Revisited. The Third Wave in Science and Technology Studies 275-281. https://doi.org/10.1007/978-3-030-14335-0_15
- Franz N, Pier N, Reeder D, Chen M, Yu S, Kianmajd P, Bowers S, Ludäscher B (2016) Two Influential Primate Classifications Logically Aligned. Systematic Biology 65 (4): 561-582. https://doi.org/10.1093/sysbio/syw023
- Garnett S, Christidis L, Conix S, Costello M, Zachos F, Bánki O, Bao Y, Barik S, Buckeridge J, Hobern D, Lien A, Montgomery N, Nikolaeva S, Pyle R, Thomson S, van Dijk PP, Whalen A, Zhang Z, Thiele K (2020) Principles for creating a single authoritative list of the world’s species. PLOS Biology 18 (7). https://doi.org/10.1371/journal.pbio.3000736
- Hoffmann M, Belant J, Chanson J, Cox N, Lamoreux J, Rodrigues AL, Schipper J, Stuart S (2011) The changing fates of the world's mammals. Philosophical Transactions of the Royal Society B: Biological Sciences 366 (1578): 2598-2610. https://doi.org/10.1098/rstb.2011.0116
- MacNeil I (2009) Uncertainty in Commercial Law. Edinburgh Law Review 13 (1): 68-99. https://doi.org/10.3366/e1364980908000966
- Raposo M, Stopiglia R, Brito G, Bockmann F, Kirwan G, Gayon J, Dubois A (2017) What really hampers taxonomy and conservation? A riposte to Garnett and Christidis (2017). Zootaxa 4317 (1). https://doi.org/10.11646/zootaxa.4317.1.10
- Schüßler D, Blanco M, Salmona J, Poelstra J, Andriambeloson J, Miller A, Randrianambinina B, Rasolofoson D, Mantilla-Contreras J, Chikhi L, Louis E, Yoder A, Radespiel U (2020) Ecology and morphology of mouse lemurs (*Microcebus* spp.) in a hotspot of microendemism in northeastern Madagascar, with the description of a new species. American Journal of Primatology https://doi.org/10.1002/ajp.23180
- Weiss C (2003) Expressing scientific uncertainty. Law, Probability and Risk 2 (1): 25-46. https://doi.org/10.1093/lpr/2.1.25